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CORRES. CONTROL
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00233 RF 05

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CORRESPONDENCE CONTROL

STATE OF COLORADO

Bill Owens, Governor
Douglas H. Benevento, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

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Colorado Department
of Public Health
and Environment

DIST.	LTR	ENC
BERARDINI, J.H.	X	X
BOGNAR, E.S.	X	X
BROOKS, L.	X	X
CARPENTER, M.	X	X
CIUCCI, J.A.		
CROCKETT, G. A.	X	X
DECK, C. A.	X	X
DEGENHART, K. R.	X	X
DEL VECCHIO, D.		
FERREIRA, D. W.	X	X
GIACOMINI, J. J.		
GILPIN, H.		
LINDSAY, D. C.	X	X
LONG, J. W.		
NESTA, S.		
SHELTON, D. C.	X	X
SPEARS, M. S.	X	X
TUOR, N. R.	X	X
WIEMELT, K.	X	X
WILLIAMS, J. L.		
ZAHM, C.	X	X
Ward, D	X	X
COR. CONTROL	X	X
ADMIN. RECORD	X	X
PATS		

April 20, 2005

Mr. Joe Legare
Assistant Administrator for Environment and Stewardship
U.S. Department of Energy-RFFO
10808 Highway 93, Unit A
Golden CO 80403-8200

RE: Original Landfill design documents (March 2005)

Dear Mr. Legare:

Comments from both the Colorado Department of Public Health and Environment, and the Environmental Protection Agency on design documents for the Original Landfill are attached. These do not include comments on the Design Analysis, which has not yet been provided for our review.

If you have any questions please contact me at 303-692-3367 or Carl Spreng at 303-692-3358.

Sincerely,

Steven H. Gunderson
RFCA Project Coordinator
Colorado Department of Public
Health and Environment

RECEIVED
APR 28 2005

Reviewed for Addressee
Corres. Control RFP

4/29/05 SC
Date By

Ref. Ltr. #

DOE ORDER #
5400.1

cc: Dave Shelton, K-H
Mark Aguilar, EPA
Vera Moritz, EPA
Susan Chaki, CDPHE
Dan Miller, AGO
Administrative Record, T130G

ADMIN RECORD

IA-A-002604

EPA and CDPHE Comments on the
Original Landfill Design (March 2005)

GENERAL

1. Four documents were provided: Drawings, Specifications, Construction QA/QC Plan, and Design Calculation Appendices. A Design Analysis (narrative) was not provided and needs to be submitted in order for EPA and CDPHE to approve the design.

DESIGN CALCULATION APPENDICES

2. Appendix A: Several key design parameters appear to be either assumed or are not discussed in the document, including but not limited to the permeability of the weathered bedrock, the stream alluvium beneath the rock drain underlying the buttress, and the compacted drain material. Because these are key parameters, field and/or laboratory testing should be performed on these materials, the test results should be used in the design, and submitted as part of the design package.

3. Appendix A: Strength parameters for Pit Fines (shown in App. G) measured in the laboratory do not correspond to the cohesive strength of 200 psf used in the stability calculations. The measured cohesion and friction effective strength parameters are approximately 125 psf and 33 degrees, and not 200 psf and 35 degrees as used in the stability analyses.

4. Appendix A: Attachment 2, Figures 1 to 3 do not have an outline of the current buttress design, which would aid in evaluation of the water level information. Cross sections are not labeled. There are 5 cross sections shown on map view, only 4 cross sections are provided in profile.

5. Appendix A: The water level profiles in Attachment 2 show that the drain as currently designed may back up water under the buttress, which could be wicked up into the fine-grained material. The problem appears to be the subsurface discharge of the gravel drain into valley fill alluvium. As currently modeled the hydraulic conductivity of the valley fill is one order of magnitude lower than the K assumed for the gravel drain material. The drain is modeled as 2 feet above the top of weathered bedrock. Water backs up in the drain to various levels depending on the depth to the top of weathered bedrock. Of course the wet year climate increases this saturation effect. Therefore we assume that any time the water level rises more than 2 feet above the top of weathered bedrock, wicking and saturation will occur in the buttress materials. None of the factor of safety calculations profiles in the subsequent sections show a water level within the buttress materials.

   Profile A - Water levels would be pulled down below the weathered bedrock in a typical year, however in a wet year the water level almost reaches the surface at the back of the buttress and again in the toe area of the buttress.

Profile B – Water levels are in the weathered bedrock until the last 40 feet of the buttress. The rise in a typical year appears to be 2.5 feet, in a wet year 5-6 feet.

Profile C – There is a deep spot in the top of the weathered bedrock just above the buttress that appears to pond water levels. The drain actually appears to increase the water levels above the current level at the back 40 feet of the proposed buttress. The water levels dip briefly into the top of the weathered bedrock as the bedrock profile rises. The water levels then appear to be 5 to 10 feet above the top of weathered bedrock for the last 60 – 80 feet of buttress.

Profile D – Water levels are reduced from the current level by the drain, but are still 2-5 feet above the top of weathered bedrock under most of the buttress in a typical year, increasing to 3 – 6 feet in a wet year. At the base of the buttress the wet year water level is 9 feet above the weathered bedrock.

6. Appendix A: Attachment 2, Figure 2 shows groundwater above the surface of the slope in Section A. There are two items of concern here. First, this condition is not reflected in the profile used in the stability analysis for Section A. The results of the groundwater modeling should be used in the stability analyses and the calculations used to develop the ground water levels used in the analysis need to be provided. Second, as previously discussed at meetings, a landfill surface configuration that indicates that seeps will occur on the slope, is an unacceptable design. The seep, as indicated in the analysis, was also not discussed in any documentation and should be addressed in the design.

7. Appendix A: The 100-year flood water levels were not considered in the stability analysis and need to be included. The stability analysis does not appear to account for the flood water levels on the slope of the buttress fill. If the water level is as shown on the figure in Appendix A, the program will infer that the fill is above the water table and is also not saturated. Further, stability of the buttress fill 3:1 slope should also be checked using total strength parameters.

8. Appendix A: Stability analyses should be performed to assess the potential effect on buttress stability of partial or full saturation of the buttress fill due to the increase in the level of surface water at the toe the buttress fill.

9. Appendix B: A revised Appendix B was received for review and accounts for areal distribution of settlement in the revised analysis. As a next step, areas with potential for ponding as a result of differential settlement should be identified. A monitoring plan should be developed to include settlement monuments at any such locations.

10. Appendix C: The conclusion presented is that "the buttress sideslopes will not meet guidance criteria unless permanent erosion mat is used...". The proposed solution using

NAG C350 erosion mat is not permanent, however. The design should consider that the buttress side-slope consists of a lower section that may be subjected more to stream scouring and saturated conditions at the toe of the buttress, and an upper section, which may be subjected more to erosion from overland flow. The two sections of the buttress side-slope may require different designs to provide long-term protection. The design should consider the use of riprap for permanent erosion protection of the buttress side-slopes. Over time, vegetation is likely to camouflage the riprap.

11. Appendix C: Mulch application of 4,000 lb/acre (see sheet C7) is not reflected in the Specifications (see Erosion Control Spec 02228-0987).

12. Appendix D: Calculations presented for analysis of the East and West channels (see Structure #5, Nonerodible Channel) indicate the use of plastic material for the bottom. However, drawings indicate grass-lined channel or NAG P550 lining (see drawing 51788-009, where NAG P550 is indicated as "permanent lining" for the East and West channels). These materials do not provide permanent erosion protection for these channels. For permanent erosion protection at the bottom of the channels, durable natural materials, such as rock riprap, are normally used. Riprap at the bottom of the channels should not destroy the ecological integrity and aesthetics of the channel, and will permit growth of vegetation, which will eventually act as camouflage for the riprap. The design should consider the use of riprap as erosion protection at the bottom of the East and West channels.

13. Appendix E: Calculations documenting the expected flows of 2 gpm need to be presented. This should include, at a minimum, not just the flow model output, but a description of the model and parameters used in the model, the areal and vertical distribution of hydrologic and hydraulic parameters, a detailed discussion of how the parameters were determined, and assumptions used in the model. Basically, a report detailing the model study should be provided.

14. Appendix E: The buttress drain, as designed, will be subject to clogging. Comparison of the fines fraction in the proposed buttress fill (pit fines) with the proposed drain rock material shows that fines will clog the pores of the drain rock. From App. G, gradation results from tests on 2 samples of pit fines indicates that the average "15 % passing" fraction has a grain size of .0025 mm. Spec 02222 indicates that the "15 % passing" fraction has a grain size of 0.5 mm for the drain rock. The ratio 0.5/.0025 is 200. To minimize clogging of the drain rock, conventional practice requires this ratio to be, at most, 40. The drain should be re-designed to minimize clogging using conventional filter design criteria and durable materials.

15. Appendix E: The buttress drain as designed will not conduct flow beyond the toe of the buttress and will cause a continuous saturation condition not accounted for in the stability calculations. The figure shows that the drain rock is underlain by stream alluvium and/or weathered claystone. By design, the drain rock must have a high permeability to function as a drain. Two borings were taken in the general area of the buttress drain. Boring log 57394 (Appendix G) indicates that the "stream alluvium" is

classified as SC; boring log 58994 indicates that the " stream alluvium" in this area is classified as GC. Both of these borings indicate that "stream alluvium" as defined by these borings is likely to have permeabilities significantly less than the drain rock. The permeabilities of the rock drain material after construction, of the weathered claystone, and of the "stream alluvium" have not been measured. To provide for drainage, the stream alluvium and weathered claystone need to have higher permeabilities than the rock drain. The permeability of these materials should be determined and provided as basic information to support the design in the design packet.

16. Appendix E - A revised Appendix F was submitted for review and shows contours of the drainageway, channel cross-sections corresponding to those contours, and calculations using the revised cross-sections. It is not clear however, if the buttress design will be revised for stability purposes. If this is the case, then these calculations will need a final revision to correspond to the final alignment of the buttress.

17. Appendix G - This appendix should provide information describing the scope of the testing program used to obtain the results presented in this section. This should include, but not be limited to:
    1) A map indicating sample locations
    2) A description of sampling methods
    3) A list of all test procedures; in particular, ASTM method D5519 needs to be presented as the method used to determine the size fractions of the Rocky Flats Alluvium

SPECIFICATIONS

18. Procedures described in other RFETS documents need to be spelled out in the Specifications and should not be incorporated by reference.

19. With respect to design changes, all changes to the approved design must be appropriately documented. The documentation should tie the originally approved language or drawing to the change. Using the RFI process to both clarify subcontractor questions as well as document design changes is confusing and inefficient. Another process for implementing a design change, which should include the approval by all pertinent parties, including the regulatory agencies, should be developed and included with these specifications.

20. Spec 01100, Part 1.05.A.2 – The RFI process should not be used to document design changes. Design changes should be documented using a separate process that incorporates regulatory approval. The RFI process should be used for its intended purpose, that is, clarification of a question or concern from the subcontractor about interpretation of a drawing, specification, field condition, contractual item, and others. Only some of the items in an RFI may of regulatory interest, while all design changes are our concerns.

21. Spec 01100, Part 1.05.A.3 – There is no time requirement shown in this specification for making the redline changes to the specifications or drawings. Please add language to this specification that requires timely changes be made to the required redline drawings and specifications.

22. Spec 01100, Part 1.05.B – For subcontractor "Supervision", only a superintendent is specified. Please clarify that in addition to the superintendent, the Quality Control Site Manager, (QCSM) as defined in the QA/QC Plan, will also be on-site while any work is being performed.

23. Spec 01110, Part 1.01.A – The work described in this section ends with placing the soil cover, however, a seeding specification is provided (Spec 02900). If seeding is to be performed for this project, then please include that in this section describing the work to be performed.

24. Spec 01310, Part 3.03.A – 1) Horizontal tolerance for the features shown should be less than that specified, ±0.5 foot. 2) The location of buttress density tests must have a vertical tolerance specified. 3) The channels and diversion berms should be completely surveyed, including the top of slope for channels and toe of slope for berms. As shown, only the feature's centerline is required to be surveyed.

25. Spec 01440, Part 1.02 – A reference to the following should be provided: "EPA, 1993, Technical Guidance Document, Quality Assurance and Quality Control for Waste Containment Facilities, EPA/600/R-93/182". The reference is accepted guidance for closing landfills.

26. Spec 01720, Part 1.01.A. – Consistent with Spec 01100, Part 1.05.A.3., clarify that a set of redlined drawings and specifications will be maintained at the site.

27. Spec 01720, Part 3.01.B.2.a. – It is unclear as to what is the intent of the phrase "...in comparison with test of Specifications or modifications." Please clarify.

28. Spec 02200, Part 1.02.A. – Please include an appropriate ASTM method, such as ASTM D5519, for gradation testing of the Rocky Flats Alluvium (RFA). It is known that RFA has particles sizes that exceed the 3-inch screen of ASTM D 422.

29. Spec 02200, Part 1.04.A – Please include the CQAE in the process that includes reviewing and approving submittals. This is consistent with Section 3.2 of the QA/QC Plan. Page 3-2 of the QA/QC Plan states: "It is also the CQAE's responsibility to approve submittals...".

30. Spec 02200, Part 1.04.A.1.a. and b. – It is unclear what the phrase "...any geotechnical data, if available" means. The title of this specification is "Geotechnical Testing". This implies that testing will be performed and available. Please remove the phrase "if available". Also, the term "size" should be replaced with "quantity", as the size of the borrow source is not as critical as the quantity of material to be utilized from the source.

31. Spec 02200, Part 3.02 – Are strength tests planned for this project? If not, then this specification appears to be extraneous to the testing to be performed for this project, and should be removed from the specifications.

32. Spec 02200, Part 3.03.A – The reference to Section 3.02 for test conditions is not needed, in that the standard property tests shown (gradation, moisture/density relationship, and Atterberg limits) do not require conditions. Please check and modify.

33. Spec 02221, Parts 1.02.B., C., and D. – The definition of these materials prohibit the use of waste material if it is visually observed. The word "visually" should be removed from each of the definitions. Any material which contains waste, whether "visually" identified or not, must be prohibited from use for a landfill final cover.

34. Spec 02221, Part 1.02.E – Soil excavated from the buttress area should not be blended and used as cover material unless it has been characterized prior to use as cover material and determined by CQAE that it is acceptable as final cover material.

35. Spec 02221, Part 3.02.2. – If waste is exposed and subsequently compacted, the area should then be considered "dirty", rather than "clean". This would then require appropriate decontamination procedures to be implemented for vehicles, machinery and other equipment prior to free release.

36. Spec 02221, Part 3.04.A.5 – This entire specification should be deleted. Material, which renders 1-foot lifts impractical, should not be used as regrade material. Material containing any rubble or waste material should be excluded from use, which is consistent with the definition of "Regrade Material" (Part 1.02.B of this specification). In addition, any soil lift thickness should not be greater than the largest particle size. The currently written language, which limits lift thickness to the "approximate average size of larger materials", is not appropriate or enforceable.

37. Spec 02221, Part 3.05.A.1. – Please provide the Design report referenced in this specification for regulatory review.

38. Spec 02221, Part 3.05.A.2. –
    1) The specification lists certain soil classifications that are either unsuitable or suitable, according to the Unified Soil Classification System (USCS). Will the soils be laboratory tested for classification purposes (i.e., gradation and Atterberg limits) in order to verify that suitable soils shown in the specification (SC, GC, SW, SP, GW, or GP) have been reached? Also, what is the acceptability of soils that classify other than those listed as suitable? For example, is a silty sand (SM) acceptable as foundation material? It is not listed as either suitable or unsuitable. The same goes for dual classified soils, such as SM-SC, SW-SM, and others. To be complete, the specification should show the full range of USCS classified soils along with their suitability as foundation material.

2) It is stated that a "site engineer or geologist" will determine acceptable foundation material. There is no explanation as to the minimal qualifications or experience a site engineer or geologist must have in order to make such a key determination. The site engineer or geologist is not listed in any other part of the specifications or QA/QC Plan. Our preference would be to have both the QCSM and CQAE provide the foundation suitability determination for the buttress excavation. Please change this specification accordingly.

3) The last sentence of this specification, indicating that excavated materials may be used as cover material, should be removed from the specification. It is currently not known what type of materials will be excavated for the buttress foundation. Some materials may not be suitable as cover material.

39. Spec 02221, Part 3.05.A.8 – This specification requires methods other than a nuclear density gage to be used to test in-place soils at a frequency of 1 per 20 nuclear density gage tests. The purpose of using the sand cone (ASTM D 1556), rubber balloon (ASTM D 2167), and oven dry moisture content (ASTM D 2216) is to calibrate the results of the nuclear density gage. We agree this is appropriate. However, our experience on many recent projects shows that the sand cone and rubber balloon density tests are not as reliable as using a nuclear gage, due primarily to the lack of experience and skill of the soil technician performing the test. Therefore, we believe that rather than basing pass/fail density testing on the sand cone or rubber balloon, the calibration should be demonstrated outside of actual in-place testing that provides pass/fail decisions.

40. Spec 02221, Part 3.06.A.1. – Similar to Comment 37 above, please provide the Design report for regulatory review as indicated in this specification.

41. Spec 02221, Part 3.06.A.2 – This specification should be removed. Unclassified material from the buttress excavation should not be "blended" and used for final cover material unless it can be characterized and shown to be suitable as cover material.

42. Spec 02221, Part 3.06.A.3. – Since avoiding over-compaction is a design criterion for placing the soil cover, then more specific language should be included in the specifications in addition to limiting construction traffic. For example, continued use of the same haul road for rubber-tired equipment must be prohibited. The use of "wet" soil (i.e., the moisture content is greater than the Optimum Moisture Content) should also be excluded.

43. Spec 02221, Part 3.06.A.4. – Remove the term "deposited" from the second sentence of this specification. Also, the term "grade stakes" should be removed from the language concerning verifying final thickness.

44. Spec 02222, Part 2, Table A – The table does not provide enough information for a gradation specification. Ranges of particle sizes should be specified.

45. Spec 02223, Parts 3.03.A., E., and F. – The term "Engineer" should be replaced by CQAE in each of these specifications.

46. Spec 02223, Part 3.03.D. – The phrase "In the presence of wind" should be removed from this specification.

47. Spec 02227, Part 1.04.A. – Consistent with the QA/QC Plan and Comment 29 above, please include the CQAE in review and approval of submittals.

48. Spec 02228-0987
    - A mulch application rate consistent with the Design Calculations Appendix C (see sheet C7) should be specified.
    - The site-wide Revegetation Plan is specified for use at the OLF. The agencies are proposing adoption of the attached table listing vegetation success criteria as part of that Revegetation Plan. Please incorporate the table to measure vegetation success at the OLF.

QUALITY ASSURANCE / QUALITY CONTROL PLAN

49. Procedures described in other RFETS documents need to be spelled out in the CQA/QC documents and should not be incorporated by reference.

50. Section 1.0, pg 1-1, 1st par. – Clarify that in addition to construction debris and general facility waste, some hazardous materials, including localized areas containing radioactive materials, were also located within the OLF.

51. Section 3.2, pg 3-2, QCSM – According to Section 3.1 of this plan, the QCSM will be an Envirocon employee. Please state in this section that the QCSM will be dedicated 100% to the role of QCSM, and will not assume any other responsibility.

52. Section 4.3, pg 4-2 – Please include a discussion of weekly engineering issues to the bullet list. Specifically, all design changes, no matter how minor it may be considered by K-H, should be discussed at this meeting with all parties.

53. Section 5.2, pg 5-1 – 1) In addition to changes being approved by the K-H Construction Manager/RM, the CQAE and the regulatory agencies (EPA and CDPHE) must approve the proposed design change, whether it has been classified by K-H as minor or not. 2) Please clarify that a summary of the RFIs, sometimes known as an RFI Log, will be kept current and provided to the participants at each and every progress meeting. A discussion of the weekly RFIs should also be a permanent discussion item, as noted in Comment 31. 3) According to the Section 3.1 of this plan, the Construction Manager will be an Envirocon employee. However, this section discusses a K-H construction manager. Please check and change for consistency.

54. Section 5.3, pg 5-1 – Same comment as 53. CQAE and the regulatory agencies must

approve all design changes. Please revise this section.

55. Section 7.2, pg 7-1 – This section states that if there are conflicting test results between QC and QA, the QC test result will be the official test result. We disagree with this approach. The conflicting test results should be investigated to determine the reason for the discrepancy. The official test result should be based only on the accuracy of the test performed, regardless of whether QC or QA performs the test. Please rework this section.

56. Section 8.2, pg 8-1 – The Certification Report must be approved by CDPHE (6 CCR 1007-3 § 265.115). Clarify that after distribution to EPA and CDPHE. the agencies will review the report and submit comments. Any appropriate changes to the report as a result of the submitted comments must be made prior to CDPHE approval of the Certification Report.

57. Table 7.1, RFI Log, Requirements – Please clarify this statement. Does "change" mean design change, or any change to the log? Also, clarify that the RFI Log to be submitted to EPA and CDPHE on a weekly basis will be updated each week.

58. Table 7.1, Regrade and Cover Material, Atterberg Limits and Sieve Analysis – The requirements listed are subjective and open to interpretation. Please rework and provide an actual metric that can be used to evaluate the acceptability of the material.

59. Table 7.1, Buttress Fill Material, Atterberg Limits and Sieve Analysis – Same as Comment 58.

60. Table 7.1, Drain Rock, Field Gradation – 1) For the Requirements column, the reference to Specification 02222 should be eliminated, as this is picked up in the Sieve analysis row. The requirement for field gradation visual inspection should be similar to that discussed in the specifications, such as poorly sorted and spreads uniformly. 2) For the QC Action and QA Action columns, the daily inspections should be performed on in-place material, not as material is delivered.

Revegetation Success Criteria

Year	Determination: FAIL[a]	PASS CONDITIONALLY (pending final determination)	PASS (high probability of successful revegetation)
2	< 5% absolute cover (desirable species[b]) AND < one-half of total vegetative cover of comparison area[d]	5 -10% absolute cover (desirable species[b]) AND one-half to three-fourths of total vegetative cover of comparison area[d]	> 10% absolute cover (desirable species[b]) AND > three-fourths of total vegetative cover of comparison area[d]
3	< 8% absolute cover (desirable species[b]) AND < one-half of total vegetative cover of comparison area[d]	8 -15% absolute cover (desirable species[b]) AND one-half to seven-eigths of total vegetative cover of comparison area[d]	> 15% absolute cover (desirable species[b]) AND > seven-eigths of total vegetative cover of comparison area[d]
4	< 10% absolute cover (desirable species[b]) AND < one-half of total veg. cover of comparison area[d]	10 - 25% absolute cover (desirable species[b]) AND one-half to nine-tenths of total veg. cover of comparison area[d]	> 25% absolute cover (desirable species[b]) AND > nine-tenths of total vegetative cover of comparison area[d]
5+ (Ultimate Year)	< 10% absolute cover (desirable species[b]) AND < one-half of total vegetative cover of comparison area[d]	10 - 25% absolute cover (desirable species[b]) AND one-half to nine-tenths of total veg. cover of comparison area[d]	> 25% absolute cover (desirable species[b]) AND > nine-tenths of total vegetative cover of comparison area[d]
ALL YEARS	> 3% absolute cover by noxious weeds[c]	0.001 to 3% absolute cover by noxious weeds[c]; effective eradication actions documented	No presence of noxious weeds[c]

[a] Failure requires remedial action - the nature of which will depend on the exact circumstances, but could include interseeding or even clean cultivation followed by seeding and mulching.

[b] Desirable species are the species included in the seed mix along with any native species that volunteer on the revegetation site.

[c] Noxious weeds included in the State of Colorado Weed Act (2003) Lists A and B.

[d] A comparison area agreed upon by USEPA, USFWS, and CDPHE in consultation with RFETS. This area may be a native area or a revegetated area at least five years old as of 2005.